1. Motivation
Many aspects of the circulation over the northeastern Chukchi shelf, its sensitivity to wind, and its impact on water mass distribution remain uncertain. In addition, links to the biological activity on this part of the shelf need to be further explored.

2. Data and Methods
- CTD, nutrient, and shipboard ADCP data from 8 synoptic cruises on the northeastern Chukchi shelf spanning the time period 2003 – 2017.
- End-member analysis to define the water masses.

3. Progression and evolution of water masses
a. Shelf-wide distributions
- Alaskan Coastal Water is advected predominantly by the Alaskan Coastal Current towards Barrow Canyon. Its presence on the shelf peaks in September.
- Bering Summer Water is commonly found in the Central Channel pathway, progressing around Hanna Shoal and displacing Pacific Winter Water.

b. Bering Strait boundary condition
- The summer months are characterized by a minimum in Pacific Winter Water percentage and a maximum in Alaskan Coastal Water percentage.
- Southerly winds enhance the presence of Alaskan Coastal Water, while northerly winds reduce it.

c. Northeastern Chukchi Sea
- Pacific Winter Water fills the region in early summer, decreasing in presence clockwise around Hanna Shoal as the season progresses.
- The injection of Alaskan Coastal Water into the region mirrors this pattern.

4. Circulation in northeastern Chukchi Sea
- The Central Channel branch bifurcates near 71.5°N as it flows northward.
- The two branches (cyclonic and anti-cyclonic) recombine southeast of Hanna Shoal and merge with the Alaskan Coastal Current.
- These patterns are consistent with the water mass distributions.
- The outflow from Barrow Canyon feeds both the Chukchi Slope Current and Beaufort Shelfbreak Jet.

5. Physical-biological links
- A late-summer 2017 cruise extensively sampled the northeast Chukchi Shelf, which displayed a two-layer structure: Alaskan Coastal Water above Pacific Winter Water.
- The winter water was generally high in nitrate.
- The high-nutrient water extended higher into the water column in region III, a known location of increased biological activity. The historical data also indicate higher nitrate in this region.

*Corresponding Author: plin@whoi.edu